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Proceedings of the regional peer review of the standardized data collection methods in support of a classification protocol for the designation of watercourses as municipal drains

11 July 2013

Burlington, Ontario

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Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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SUMMARY

A regional science peer-review meeting was held on 11 July 2013 in Burlington, Ontario. The purpose of the meeting was to review the standardized data collection methods in support of a classification protocol for the designation of watercourses as municipal drains. The items for review included the proposed criteria that would be used to determine sensitive fish species; the resulting list of sensitive species (assessed to ensure that there were no omissions or inappropriate inclusions); and the draft document titled "Standardized data collection methods in support of a classification protocol for the designation of watercourses as municipal drains."

The Science Advisory Report includes recommendations and guidance on procedures to be used in the classification of drains, as well as in the identification of sensitive species. Meeting participants included Fisheries and Oceans Canada (DFO)-Science, DFO-Fisheries Protection Program, Ontario Ministry of Natural Resources, Conservation Authorities, and environmental consultants.

This Proceedings report summarizes the relevant discussions of the science advisory meeting. The Proceedings and the Science Advisory Report resulting from this advisory meeting are published on the DFO Canadian Science Advisory Secretariat (CSAS) Website.

Compte rendu de l'examen régional par les pairs des méthodes standardisées de collecte de données à l'appui d'un protocole de classification pour la désignation des cours d'eau comme les drains municipaux

SOMMAIRE

Une réunion régionale d'examen scientifique par les pairs s'est tenue le 11 juillet 2013 à Burlington, en Ontario. La réunion avait pour but d'examiner les méthodes normalisées de collecte de données à l'appui du protocole de classification visant la désignation de cours d'eau en tant que drains municipaux. Les éléments examinés comprenaient les critères proposés à utiliser pour déterminer les espèces de poissons vulnérables, la liste des espèces vulnérables en découlant (passée en revue pour s'assurer que certaines espèces n'avaient pas été omises ni ajoutées de façon inappropriée) et le document provisoire intitulé « méthodes normalisées de collecte de données à l'appui du protocole de classification visant la désignation de cours d'eau en tant que drains municipaux ».

L'avis scientifique comprend des recommandations et des directives relatives aux méthodes à utiliser lors de la classification des drains et de la détermination des espèces vulnérables. Parmi les participants à la réunion, on comptait des représentants du secteur des Sciences de Pêches et Océans Canada (MPO), du Programme de protection des pêches du MPO, du ministère des Richesses naturelles de l'Ontario et d'organismes de protection de la nature, ainsi que des experts-conseils en environnement.

Le présent compte rendu résume les discussions pertinentes de la réunion de consultation scientifique. Le compte rendu et l'avis scientifique qui ont été rédigés à la suite de cette réunion de consultation sont publiés sur le site web du Secrétariat canadien de consultation scientifique du MPO.

INTRODUCTION

Agricultural watercourses in Ontario have been designated as municipal drains. To streamline regulatory processes for maintenance works, these watercourses are classified based on temperature, permanency of flow, and fish species present. Currently, maintenance works on three drain types require a site specific review by Fisheries and Oceans Canada (DFO) including Types D and E drains that contain sensitive fish species and those watercourses that have species at risk present and/or mapped critical habitat (includes fishes and/or mussels that are Threatened or Endangered). These three drain types are more sensitive to municipal drain maintenance works, which typically involves dredging the bottom of the drain and removing excess sediment. Drain types D and E are classified based on temperature and fish data that have been collected in the field. Species at risk presence is determined by using the Species at Risk Maps, or by detecting species at risk during fish sampling. If either source indicates the presence of species at risk then an SAR class will be applied.

The purpose of the meeting, as described in the Terms of Reference (Appendix 1), was to review the methods that DFO Science was asked to provide to be used to create the sensitive fish species list to ensure that the approach is scientifically sound, and to review the resulting list of sensitive species to ensure that no sensitive species have been omitted and non-sensitive species are not included. In addition, a draft sampling protocol has been created for collecting temperature, flow, and fish data required for municipal drain classification. DFO Science has also been asked to review this sampling protocol to ensure it is scientifically sound. A peer-review meeting on 11 July 2013 and a subsequent conference call on 23 July 2013 were held to discuss the objectives of the meeting.

Meeting participants included DFO-Science, DFO-Fisheries Protection Program, Ontario Ministry of Natural Resources, Conservation Authorities, and environmental consultants (Appendix 2).

DETAILED DISCUSSION

The meeting chair provided the participants with an introduction to DFO's Science Advisory process. This included information on the Scientific Advice for Government Effectiveness (SAGE) Principles, the products of the meeting, the guiding principles, the role of participants, and the objectives of the meeting. A draft research document entitled "Standardized data collections methods in support of municipal drain classification sampling protocol" had been developed by DFO Science and provided to participants in advance of the meeting. The draft research document was the basis for discussion, and participants were encouraged to add to or change the material as needed to ensure that the best and most up-to-date information was included.

STUDY DESIGN

Presenter: Nicholas Mandrak

The presenter reviewed the municipal drain classification process.

A participant noted that the drain classification decision tree suggested that the thermal classification of a drain was determined by the fish classification. Because fish were not the only criterion used to determine the thermal class, the participant stated that the decision tree needed to be changed. The participant also noted that the classification of B drains might change if new evidence affected the thermal regime classification.

The presenter agreed with the participant's points and stated that the flow chart needed to be modified in order to de-couple fish species and thermal classification.

Another participant noted that beside each type of drain classification in the tree was the label "SAR" (Species at Risk). In the table, all of the SAR fishes were classified as being sensitive species. The

participant asked why certain drains were listed as having "no sensitive species" and yet had the SAR label beside them.

The presenter suggested a change to the guidance so that the SAR label was removed from the sensitive species list and the two factors were treated independently.

A third participant noted that one of the reasons to keep the table the same was that the SAR mapping was being used to determine the presence of SAR in a system. They explained that the SAR mapping could indicate that there are SAR species in a system that is not otherwise rated.

The presenter suggested that guidance be added to the document stating that, if SAR mapping indicates the presence of SAR, further assessment of the drain may be required. The participant responded that a drain classification guidance document was being created and that it would address this issue.

On the topic of flow, a participant asked what happens if a species at risk is seasonally present, but is not present during a drain cleanout. Another responded that the area would be "earmarked" as habitat for SAR.

A conversation followed around the classification of species listed under the *Species at Risk Act* (SARA) versus the *Endangered Species Act* (ESA). A participant noted that the classification process at present only applied to federally-listed SAR species. The presenter proposed a recommendation to incorporate species that are listed under ESA as "threatened" or "endangered."

The presenter also proposed that all of the species in the document be classified. The SAR rating would be used as the criterion for sensitive species, even though there would be specific guidance on how to handle the different classifications.

Another participant added that they would like to see people reference the SAR maps as background information. Sampling had already been done by Science and the maps could be used to determine the SAR class of a drain. They added that they would like to see the background information in the document state that people should sample only drains that have yet to be classed or those for which they do not have any information.

As an aside, a participant noted that in the past they had provided a copy of their database to feed into the SAR mapping (which contains presence/absence data) and did not know who to give it to. The presenter responded that it should be given to the meeting chair to be added to the SAR database.

The presenter stated that, after reading over the document, they felt that there should be some changes. They explained the formatting of the edits so that the participants could follow clearly.

One change that the presenter proposed was to replace the phrase "historical data" with "existing data." The reason for this change was that the original phrase required a definition, whereas the new phrase was clearer.

Another participant asked if there was a point at which existing data would be considered too old to be valid. The presenter responded that, if there was a reason to believe that the data was incomplete or no longer valid, then there would be a need for additional sampling. They added that they would rather the decision be made on a case-by-case basis than by following guidance. This would be a topic that the separate guidance document might address.

SAMPLING PROCEDURE

The presenter discussed the classification of drains in terms of their geographical reach, explaining that one drain might be broken into segments with each one receiving its own classification. The document provided some preliminary guidance on this process.

The presenter stated that a drain segmentation layer does not currently exist; a participant responded that it does, in the sense that some mapping includes segmentation. They added that more segmentation would occur as more data was collected.

The presenter asked what was driving the segmentation. The participant responded that data related to classification was the primary driver, but road crossings were a major consideration because they were access points to the drains.

There was some debate over whether future sampling should occur at the road crossing or nearby in the channel itself. While the road crossing would provide the best access to fish, the channel would need to be classified based on its physical dimensions, which can be quite different than those of the crossing. A participant suggested adding to the text the reasons to sample away from the crossing; the presenter agreed and proposed inserting the guideline that sampling should occur "where the channel morphology is consistent" and where access is available. This guideline would replace the presenter's original suggestion of sampling 20 m from the road crossing.

The participant who started the discussion cautioned the group not to discourage or undervalue sampling at road crossings. The participants agreed that these areas should not be ignored and that the protocol needed to be flexible to allow the most accurate sampling possible.

FLOW

The presenter reviewed the three major criteria for classification – flow, temperature and fishes – giving the definitions of different flow types.

In response to the guidelines for flow determination, a participant noted that a drain with no flow is not necessarily dry: it could be wetted or have standing water. The meeting chair said that they would add wording to the document to ensure that this point was clear.

Another participant mentioned that, in a conference call, a third party had suggested creating an engineering definition of flow with parameters around it such as the 7Q20. (The guideline of measuring system flow by a given number of dry months appeared to be somewhat arbitrary.) Another participant responded that creating such a definition would likely overcomplicate the matter, but agreed that the current guidelines were problematic. The presenter suggested that these should be identified as concerns, but also stated that a decision on the matter would not likely be reached at this meeting.

A third participant asked if there was a definition that Science used for the word "intermittent," pointing out that variations in weather affected the length of time for which a drain would be dry. Another added that they would like to see the language revised, explaining that there was confusion around the terms "flow" and "dry." For example, a site could be characterized as having "continuous flow" and yet be dry for three months of the year.

The presenter suggested that, under "permanent systems," the wording be changed to read "if a water course continues to flow or is wet." They also suggested limiting the use of the label "intermittent" to first-order streams in order to limit the biological impact if the classification were incorrect. Following some discussion around the need for testing to ensure that the change is prudent, as well as the circumstances under which classifications can change, it was agreed that an addition would be made to the recommendations section explaining the need for a more thorough discussion of the terms used in the classification process.

Permanency of flow

The presenter reviewed existing data that might assist with determining permanency of flow, as well as potential sources of data. Knowledge gaps were also addressed.

The presenter made the point that one can only make statements about permanency of flow from the point of data collection and upstream of that point. A participant responded that there are geologies where one can find flow upstream of an intermittent system, and suggested adding wording to the statement in the document such as "unless the geology supports." The presenter suggested instead adding the note "there will be exceptions based on geology," and covering those exceptions, as well.

The presenter mentioned a handbook written by the Ontario Ministry of Natural Resources (OMNR) which might assist with creating definitions of permanency and intermittent flow. A participant responded that the Toronto Region Conservation Authority (TRCA) has a similar publication which might be useful.

The presenter also suggested using water lever loggers and water temperature loggers at the bottom end of a drain segment in order to collect data. A participant responded that they would be cautious using temperature loggers at the top and bottom ends of the drain as there could be water flowing at a road crossing, but not through the rest of the drain. Another participant stated that temperature loggers have worked very well to determine permanency of flow in the past.

No additions were made to the list of knowledge gaps.

TEMPERATURE

The presenter reviewed the criteria for classifying water temperature, as well as methods of data collection and knowledge gaps.

A participant noted that, because the agricultural community is becoming more involved in the data collection process, it would be helpful to include fish assemblage protocols in the document. The presenter responded that this particular method of determining water temperature might not always be the most efficient; however, it might be useful to include both methods. Another participant agreed.

The issue was raised that sampling fish to determine water temperature may result in ambiguity: for example, one might miss the capabilities of the stream to support species that are not present for reasons other than water temperature. In the cases of fish sampling, the participant suggested reviewing summer temperature readings against those of a nomogram.

Another participant asked if there had been studies that indicated how the fish community should be used to determine the temperature of a system. The presenter responded that an empirical study had been conducted using fish presence and absence. The participant expressed discomfort using fish to determine the temperature status of the drain, again citing other conditions that affect the presence and absence of fish.

A third participant advocated using recorded water temperatures; however, another responded that fish assemblage allowed for data collection outside of critical temperature months. They said that if the science supports using the fish community to determine the thermal regime, then it should be included in the document. If not, the method should be removed altogether. The presenter responded that the method is viable, and the strengths and weaknesses of the method should be included in the document.

A participant asked if the method of measurement used in southern Ontario was appropriate for northern Ontario. This question was listed in the knowledge gaps, and a colleague outside the meeting would be consulted.

The presenter reviewed the methodology of recording the water temperature of drains. A participant pointed out that the document did not include data collection protocol. They suggested a standards document prescribing exactly what data is recorded. The participant also asked if the nomogram could be turned into a classifier (a table that gives output values for input values in the form of a matrix).

There was some discussion around the methods of classifying different segments of the same drain. The presenter suggested adding the geological exceptions discussed in the flow section of the document to the temperature section, as well. A participant added that another exception would be the presence of a large, fairly deep tilled system from which cold water could flow into other areas.

Before the discussion concluded, a participant asked where one should take the temperature within the water column. The meeting chair responded that they would review the literature to see if that information was provided. That direction would be added to the research document.

Another participant mentioned that the sampling methods listed in the research document should match those given in the Ontario Stream Assessment Protocol (OSAP). The presenter agreed to ensure that was the case.

FISH SAMPLING

The presenter reviewed the protocols for determining the presence of SAR in a drain, as well as situations in which sampling is not required, and knowledge gaps.

A participant raised the issue of intermittency, explaining that sensitive species will be present in refugia pools that are not flowing. Another replied that the presence of SAR takes precedence over the classification of the drain flow.

A conversation followed around the use of the term "intermittent" as it related to pools. In the end it was agreed that a pool would be categorized as a different segment within a drain.

In the discussion of sampling protocol, the presenter noted that a warning needed to be added stating that electrofishing should only be conducted by trained and certified individuals, and that it is not effective in habitats with high turbidity and low conductivity. A participant added that it is not effective in habitats with high conductivity, either.

Another participant noted that they may want to add cases in which seine nets are inefficient (e.g., where there are large amounts of debris, boulders, or other obstacles).

Another asked if the document should include hoopnets as a mode of sampling since most people do not have access to boat electrofishers. A third suggested making only a cursory reference to hoopnetting, since it would be difficult to give specific guidance in the context of the document. The presenter offered to come up with some guidance on the topic.

There was some discussion around the permits required for sampling. It was agreed to change the wording in the document to match that of the OMNR collectors permit.

A participant raised the issue of fish identification, noting that most people do not have the required expertise. The presenter proposed adding a note to indicate that proper training is needed as well as listing sources that explain the identification process.

The presenter reviewed the guidance on sampling and sensitive species. A participant asked why a minimum of three passes was required when a sensitive species is captured in the first haul. The presenter responded that they would like to collect data that will refine future science advice.

Another participant noted that point 1a prescribed a sampling size of 10 times wetted width (m) or 40 m, and asked whether there should be wording on what do to if sampling of this scale is not possible. The presenter agreed to add that point. Another participant asked where the guideline of 10 times wetted width or 40 m came from. The presenter responded that it came from a colleague's recommendation based on their knowledge of the literature. It was also a trade-off: compared to previous guidance on sampling, the number of passes had increased and the length of the sampling area had been reduced.

A participant mentioned that OSAP already had a protocol for sampling wadeable drains, and expressed a concern over providing different guidelines from those that already existed. After some

discussion the presenter offered to address the topic again with the colleague who had originally suggested the sampling guideline.

The presenter stated that vouchers should be kept for each species collected. A participant asked if they should keep only vouchers for species that would be used to classify the drain, since keeping all vouchers would increase the onus and expense. The presenter replied that keeping all vouchers would prevent having to sample again as a result of misidentification.

The presenter overviewed the guidelines for seining. A participant asked if the document should include advice on mesh size of the seine; the presenter agreed that it should. Another participant asked if block nets should be included. The presenter responded that their experience had been that block nets were not any more efficient at increasing species count, and therefore did not need to be included.

A participant asked if the text should address the issue of barriers. The presenter said that it should, and suggested treating a barrier as an automatic segment delineator. The presenter added that it might be more appropriate to add that point to the segmentation section, but assured that it would be incorporated.

Returning to the topic of seining, a participant asked if the three prescribed seine hauls should cover the entire site, or only sections of it. The presenter was unsure which would be better, and asked for feedback. The same participant suggested five seine hauls spread throughout the site. Another participant disagreed, saying that one should use the same amount of area that one would cover using an electrofisher. The two participants agreed that the area should be divided into units, and that each unit should be seined three times. The presenter proposed moving upstream to downstream if there are flow issues, and moving in the opposite direction if there is no flow. The participants agreed.

There was some discussion around whether or not this process was more work than it needed to be. It was decided, for reasons of accuracy and data accumulation, that it was not. A participant added that they thought it was important to include in the document both the need for data and the fact that species with low detection probability are not likely to be captured on the first round of sampling. The presenter agreed to add these points and the advice on seining to the document, as well as the minimum required sampling for people who have more limited resources.

The presenter went on to review the protocols for sampling to determine a drain's entire fish assemblage. A participant noted that a paper mentioned in the text (Smith and Jones) was not included in the references.

Another participant recommended that the phrase "established existing protocols could be used" be changed to "*should* be used."

The same participant mentioned that detection probability will vary by different factors, including gear, habitat and abundance of target species, and that the protocol in the document is a compromise. The presenter agreed to add that information to the introduction of the fish sampling section.

The question was raised as to whether mussel sampling should be included in this document, as well. It was agreed that mussels should receive a separate request for Science advice, and that such a request could easily be addressed.

Sensitive species criteria

The presenter reviewed the criteria associated with the different classifications of species.

A participant raised a question with respect to environmental tolerances, asking if a decision tree had been used to classify species with intermediate tolerances. The presenter replied that majority consensus of the three main tolerance papers was used, and where the average was intermediate, it

was an assessment on the presenter's part. The presenter invited the participants to raise any issues that they identified.

The same participant suggested that more guidance was required in the decision-making process. They proposed that, if the species has one intermediate tolerance ranking, then Science should have a rule as to how the species should be classified.

In a discussion around classifying Brook Stickleback, the participant reminded the presenter of a paper by Gordon Wichert in the North American Journal of Fisheries Management (1995). In that paper, species in the Greater Toronto Area were divided into four classes and their tolerances were ranked.

After some discussion around classifying the species' environmental tolerance, the presenter proposed that the research document include the knowledge of the experts present at the meeting. When the rankings deviated from the published literature, the document should indicate the reasons why.

There was some discussion around different species of fish; however, no changes were made to the rankings at this time. A participant suggested that the group review the rankings in more detail; the meeting chair agreed and proposed that everyone review the table and discuss it in a conference call at a later date.

VOUCHERING

The presenter reviewed the guidance for vouchering, including digital records.

The presenter stated that at least one crew member should be officially trained in fish identification, giving the Royal Ontario Museum (ROM) course as an example. A participant asked if a listing of recognized fish identification courses should be provided. The presenter suggested that the guidance document provide information of this nature.

There was some discussion around what to do with vouchers once they are collected. A participant recalled that earlier sampling protocol dictated that all fish under a certain size were sent to the ROM. The presenter responded that the ROM probably was not able to process large numbers of vouchers at this time.

The presenter noted that the document included a table that provided guidance on whether or not digital vouchers were acceptable for a species, and if so, what features need to be photographed. The meeting chair proposed that the group review this table in addition to the environmental tolerance table and discuss both in a conference call in approximately two weeks' time.

FOLLOW-UP CONFERENCE CALL

23 July 2013

Presenter: Lynn Bouvier

Review of Table A1

The presenter reviewed the comments that had been provided by the group ahead of the conference call. The feedback had been consolidated into a single document to avoid overlap and to make the review process as efficient as possible.

In the review of the introduction to Table A1, a participant had asked if the criterion of specialized habitat might be redundant. They explained that there were few cases where the species was listed as sensitive because of this criterion (most were listed because of the SAR listing or the tolerance ranking in the literature).

A participant responded that it was possible that the criterion was already taken into account under "environmental tolerance." They posited that, if a species has specialized habitat, it may not be as environmentally tolerant. The group decided to discuss the table in full and decide at the end of the review whether or not to remove the criterion.

In the discussion of the environmental tolerance section, the presenter noted that many participants had stated that the section required more detailed information. The presenter had discussed the matter with another participant ahead of the meeting, and they proposed that a brief literature review be added to this section in order to indicate what characteristics were used to determine environmental tolerance.

There was also a comment about the confusion that arose from combining sources in this section. The presenter proposed that another suggestion made in the review – the addition of a new criterion called "expert opinion consensus" – would solve this problem. This criterion had been proposed in order to address situations where the information presented in the literature did not match the expert opinion of the participants.

The presenter then reviewed the table, addressing one species at a time.

Longnose Sucker was listed as sensitive (S); however, one participant thought that it may be tolerant (T). The reason for the original listing was that the species migrates to specialized habitat; however, that habitat was not so specialized that it was limiting to the fish.

The presenter asked if the group agreed with the change. A participant expressed some reservation based on their own observations: in degraded sites where White Sucker had been found, they had not seen Longnose Sucker. Some participants agreed that there may be other reasons for this absence, the primary one being that the fish are already difficult to find in southern Ontario.

The group was split on whether or not to change the listing. There was some discussion on how to list fishes that had been ranked as "moderate" (M) in the literature, since there was no corresponding ranking in the table and there were reasons to list the fish as both Sensitive (S) and Tolerant (T). In the end, a participant proposed the conservative listing of S unless there was reason to argue otherwise. The group agreed, leaving the listing of Longnose Sucker as S in accordance with the rankings in the literature.

Northern Redbelly Dace was the next fish that the group discussed. A participant was not sure that specialized habitat requirements existed for this species. The reason for the original listing was that the wetland habitat required by the fish is rare in Ontario; however, the group agreed that that was not the same as the fish requiring specialized habitat. The criterion was deleted for the species.

As a result of this deletion, the fish was left only with a M ranking from the literature. Originally the species was listed as S; however, the group agreed based on expert opinion that it should be listed as T.

The next species on the list was Finescale Dace. A participant suggested that the case for this species was very similar to that of Northern Redbelly Dace. The group agreed to delete the criterion of specialized habitat requirements and list the species as T.

Rainbow Darter was originally listed as S. A participant suggested, based on their own observations, that the species was in fact T. Another argued that the scores in the literature called for a S ranking. The group agreed to maintain the original listing and not include expert opinion in this instance.

Iowa Darter had a ranking of "moderate-intolerant" (M-I). A participant had asked if it should be listed as T. Another participant agreed with this change. The first one explained that they had found the species in a range of habitats in Ontario. T therefore was listed under "expert opinion."

The next species was Brassy Minnow. A participant suggested that, based on the discussions of Northern Redbelly and Finescale Dace, it should also be listed as T.

The participant suggested removing the criterion of specialized habitat requirements for this species, noting that disjunct distribution was in some cases being equated with specialized habitat requirements when in fact the populations may be disjunct for other reasons. The group agreed to remove the criterion. They also decided to change Pearl Dace from S to T.

Golden Redhorse was the next species discussed. A participant had noted that the tolerance rankings might suggest a ranking of T as opposed to S. Another responded that, because the rankings averaged M, the conservative approach would be to keep the species listed as S. The group agreed; however, a later conversation about Silver and Shorthead Redhorse led the group to restore to the T ranking (see below).

The group then reviewed the ranking for Greater Redhorse. A participant had asked if this species should be listed as T. It had only one ranking in the literature, Intolerant (I), and so the table listed the species as S. The group agreed that this was the appropriate ranking.

Blackchin Shiner was listed as having specialized habitat and two I classifications. For these reasons it was listed as S in the table. However, a participant wondered if the species should, in fact, be listed as T. A participant noted that the characterization of the habitat as specialized may be inaccurate. It was proposed that the habitat be removed from the listing, but that the ranking of S be maintained because of the rankings in the literature. The group agreed, and also decided that the same changes should be made to the listings for the *Heterolepis* sp.

Bloater received several responses suggesting that the species be listed as S. Following some discussion of the conditions in which the species had been found, the listing was changed from T to S based on expert opinion.

In the listing for Lake Chub, a participant noted that the species migrates from lakes to streams for spawning and asked whether this move would constitute specialized habitat requirements. In light of the conversation around Longnose Sucker, and in light of the data collected on the species, the group decided to maintain the ranking of T.

Greenside Darter had received two rankings of M and one of I in the literature; however, the species was listed as T in the table. A participant asked if the ranking should be changed to S based on the rankings of other species. Other participants responded that, based on their own experience, they thought the species should be listed as T. This ranking was listed under "expert opinion."

Fantail Darter received a ranking of T; however, a participant asked if the tolerance rankings given in the literature merited a ranking of S. Because the participants did not have strong feelings about the ranking based on their own experience, the group agreed to change the ranking to S to remain consistent with the previous tolerance rankings.

The next species discussed was Least Darter. The same question arose for this species as for the Fantail Darter. The participants who had expertise with this species agreed that it should be listed as T. For this reason the ranking was maintained.

Threespine Stickleback was listed as T. Two participants had commented that the tolerance rankings from the literature suggested a rank of S; however, one also mentioned that they agreed with the ranking of T. It was proposed that the ranking of T be listed under "expert opinion."

Another participant pointed out that the species is native to some habitats and introduced into others. A third suggested creating two listings to distinguish between the two categories. For introduced populations the tolerance ranking would be irrelevant because the group would automatically not be considered a sensitive species. Only the native populations would receive a tolerance ranking.

Based on expert opinion, the group agreed that the species could be found in a range of habitats, and so the tolerance ranking should be T. The table would be edited to include a footnote about the introduction of the species to some water bodies.

Northern Hogsucker was next on the list. The species was ranked as T, which went against the tolerance rankings from the literature. The group agreed that changing the ranking to S based on the literature would be consistent with the treatment of similar species.

Smallmouth Buffalo was listed as "introduced" in the table. A participant asked if "non-native" would be a more accurate description. After some discussion of existing literature on the topic, Smallmouth Buffalo was listed as "non-native," Bigmouth Buffalo was listed as "native" and Orangespotted Sunfish was listed as "non-native."

The tolerance ranking of Northern Sunfish again suggested a ranking of S; however, it had been listed as T in the table. The group felt that they did not have strong evidence to support a ranking of T, and so the species was listed as S instead.

Burbot had only one ranking of M, and was listed as T. Based on their own knowledge of the species; a participant suggested that a ranking of S might be more appropriate. It was stated that the species can be found in turbid systems, and so the ranking of T was given under "expert opinion."

Smallmouth Bass was next in the discussion. The species was given an average ranking of M in the literature and was listed as T in the table. A participant proposed changing the ranking to S because of its habitat requirements for spawning. The group decided that their own knowledge of spawning habitat indicated that the species was, in fact, T, and so the ranking was not changed.

Silver Redhorse was listed as T although the literature suggested S. A participant argued that, because the species could be found in warm and turbid waters, it should be listed as T. The group agreed to keep the ranking and list it under "expert opinion." The same decision was made for Shorthead Redhorse.

River Chub was listed as T, which contrasted the average tolerance ranking in the literature. The group could not offer any information that supported a ranking of T, and so it was changed to S.

In the existing literature Ghost Shiner was ranked in as M and I, suggesting a ranking of S; however, the group agreed that a ranking of T based on expert opinion was more appropriate. Both *Nocomis* sp. were changed to S.

Mimic Shiner had rankings of M and I the literature, and an overall ranking of T. The participants agreed that they found abundant samples of the species in a range of habitats, so the ranking was maintained.

Stonecat was listed as T, which one participant found surprising. The rankings in the literature averaged M. A brief discussion of habitat followed, from which the participants determined that a ranking of T based on expert opinion was appropriate.

Tadpole Madtom had three M and two I rankings in the literature; however, it was ranked in the table as T. Comments had been made in the document stating that the literature prompted a S ranking. However, participants' experience with the species supported a ranking of T; therefore it was maintained.

The next species discussed was Pygmy Whitefish. The species had been ranked as T, which contradicted the literature. In light of the conversation around Bloater, the group agreed to rank the species as S.

Ninespine Stickleback was the last species discussed in the table. A participant proposed ranking it as S based on expert opinion; however, the group felt that they did not have sufficient knowledge to justify changing the ranking.

The participants revisited the question of whether or not to remove the specialized habitat criterion from the table altogether. A participant suggested that the criterion did not help with the decision-making process. The presenter agreed, noting that it was not used once in the review they had just conducted. The question was raised as to whether or not the decision would affect the rankings of species not

listed on the table. Other participants pointed out that the expert opinion and tolerance categories could provide room for considerations of this nature; however, a participant was unsure about whether or not spawning habitat would fit into these categories or require one of its own. The group agreed to remove the category of specialized habitat requirements for the time being and re-evaluate the table. If changes to the rankings resulted, the group would consider whether or not those changes could be addressed under "expert opinion."

A participant had reviewed the species and found that a few had specialized habitat but had tolerances other than S. One of the co-authors offered to review those species and report back to the group.

Another participant noted that, in the Barber et al. tolerance listings, it was not clear that the given tolerance exceptions were applicable to this part of the world. It was agreed that one the authors would review the listings to ensure that there had not been any oversights.

Review of Table A2

The presenter reviewed the comments to the appendix.

In response to the point that all small juvenile fishes and all Lampreys should be preserved in 70% ethanol, a participant had asked whether or not this was, in fact, necessary. (The concern was that, by preserving all specimens, fish would be killed needlessly.)

The presenter responded that it was nearly impossible to identify these fish in the field, and so they needed to be identified either in the lab under a microscope or using genetic testing. The participant responded that if specimens were to be identified in the lab, it might be preferable to use formalin instead of ethanol to better preserve the specimen. Another stated that more than 70% ethanol was required to preserve a specimen satisfactorily, recommending 90 or 95% instead. The participants agreed to confirm the number with a colleague outside the meeting.

There was some conversation around the question of who would identify all the specimens that were captured and preserved. The presenter explained that DFO identifies specimens in a variety of different situations, and records cannot be considered valid if a voucher does not exist. The group agreed that vouchers must be kept, with several participants affirming that digital vouchers (photographs) are preferable whenever possible. It was agreed to add wording to encourage the use of digital vouchers.

Another participant asked whether all specimens needed to be preserved, or only one of each species. The presenter offered to follow up with a participant who had left the meeting in order to clarify that point.

The presenter reviewed the comments about the table, which listed the photographs required for digital vouchers of species sampled.

For Alewife, additional shots of the head were requested to help distinguish it from Blueback Herring. The group agreed.

For Eastern Sand Darter a participant recommended removing the requirement of a close-up side view of the head. The group decided that the change was not necessary.

A participant suggested adding a comment that outlined how to take a side-view photo of a specimen. The participants agreed on the wording "the fish should fill the frame."

For the next three species, Central Stoneroller, Lake Whitefish and Lake Chub, it was recommended that the shots include a close-up side view of the head. For Lake Chub it was also recommended that an aside be inserted stating that the shot should show the terminal barbel.

For Common Carp, a request was made to photograph a ventral view of the head that clearly showed the presence of barbels. The group agreed without any need for discussion.

The following additions were also agreed on without discussion:

- Brassy Minnow: include a close-up side view of head
- Eastern Silvery Minnow: include a close-up side view of head
- Green Sunfish and all other *Lepomis* sp.: full side-view of the dorsal fin with fins erect
- Striped Shiner: close-up dorsal view of head to dorsal fin origin
- Common Shiner: close-up dorsal view of head to dorsal fin origin
- Pearl Dace: full close-up side view of head
- Smallmouth Bass: full side view, mouth closed, dorsal fins erect
- Largemouth Bass: full side view, mouth closed, dorsal fins erect
- Hornyhead Chub: close-up side view of head
- River Chub: close-up side view of head
- Golden Shiner: close-up of keel to show scales
- Trout Perch: full side view, adipose fin visible
- Northern Redbelly Dace: full side view; close-up side view of head; ventral view of head
- Finescale Dace: full side view; close-up side view of head; ventral view of head
- Bluntnose Minnow: close-up side view of head
- Fathead Minnow: close-up side view of head
- Sauger: full side view, dorsal fin extended
- Walleye: full side view, dorsal fin extended

During the discussion, the presenter suggested numbering the shots so that readers could easily see how many pictures to take of each species. The group agreed that this would be helpful. The presenter offered to make that change in the next round of edits.

A participant asked if Pearl Dace had been renamed Northern Pearl Dace, and also pointed out that the scientific name in the document was incorrect. The presenter volunteered to double-check the common name of the species and made the necessary edit.

For White Perch and White Bass it was recommended that the photographs include a full side view and a close-up of the anal fin clearly showing the anal spines. This shot would help to differentiate between the two species. The presenter asked if these characteristics could clearly be seen in a photograph, which the author of the comment confirmed.

A close-up of the keel was recommended for Rudd as well as Golden Shiner. There was a brief discussion of whether or not photographs would capture the scales; it was agreed that they would.

A shot listed for Emerald and Rosyface Shiner was edited to read "full side view, dorsal *and pelvic* fins extended." A participant commented that taking that shot might be difficult; however, the group agreed that this directive was the ideal and suitable to leave in the document.

For all *Oncorhynchus* sp., a shot of the full side view with the anal fin extended was requested for juveniles. The presenter asked if a separate shot of the extended anal fin would be preferable. The author of the comment agreed and added that a shot of the spotting on the adult's caudle fin would be useful, as well. The participant also suggested a close-up of the head with the mouth open.

A participant noted that the scientific name of the Finescale Dace was incorrect; the genus had changed back to *Chrosomus*. The presenter made the edit to the document.

For Fathead Minnow and Bluntnose Minnow, it was specified that the shot of the dorsal fin should be taken from the dorsal view.

The presenter asked the participants if they wanted to review the changes made to the document. The group agreed to review it electronically and send their comments within a week's time.

The presenter thanked everyone for participating in the call and aimed to send the document to the group by the end of the following Thursday.

APPENDIX 1: TERMS OF REFERENCE

Science review of standardized data collection methods in support of municipal drain classification sampling protocol

Regional Peer Review Meeting – Central and Arctic Region

July 11, 2013
Burlington, Ontario and via WebEx

Chairperson: Lynn Bouvier

Context

Agricultural drains in Ontario have been classified based on temperature, flow (permanent vs. intermittent), fish species present, and time since last drain clean out. Currently, maintenance works on three drain types require a site specific review by DFO including: Types D and E drains which contain sensitive fish species and those watercourses that have Species at Risk present and/or mapped critical habitat, (includes fishes and/or mussels that are Threatened or Endangered). These three drain types are more sensitive to drain maintenance works, which typically involves dredging the bottom of the drain and removing excess sediment. Drain types D and E are classified based on temperature and fish data that has been collected in the field. Species at Risk and critical habitat presence is determined using the Species at Risk Maps.

The list of sensitive species included in the database to drive this criterion is being revised. Fisheries and Oceans Canada (DFO) Science has been asked to review the methods used to create the sensitive fish species list to ensure that the approach is scientifically sound, and to review the resulting list of sensitive species to ensure that no sensitive species have been omitted and non-sensitive species are not included.

In addition, a draft sampling protocol outlining for municipal drain classification has been created, which outlines sampling methods that should be used to ensure that the fish assemblage is properly sampled to detect sensitive species and, ultimately, that drains are classified properly. DFO Science has also been asked to review this sampling protocol to ensure it is scientifically sound.

Objectives

The objectives of this meeting are to:

1. Review the proposed criteria that will be used to determine sensitive fish species.
2. Review the resulting list of sensitive species for any omission or inappropriate inclusions.
3. Review the draft document titled "Sampling Protocol for Municipal Drain Classification".

Expected Publications

- Science Advisory Report
- Proceedings
- Research document

Participation

- Fisheries and Oceans Canada (DFO) (Science, Species at Risk, Fisheries Protection Program)
- Ontario Ministry of Natural Resources
- Conservation Authorities
- Royal Ontario Museum
- Other invited experts

APPENDIX 2: MEETING PARTICIPANTS

Regional Advisory Meeting – Central and Arctic Region

Canadian Centre for Inland Waters, Burlington, ON

Initial meeting: 11 July 2013
Follow-up meeting: 23 July 2013

LIST OF PARTICIPANTS

Last name	First name	Affiliation	Participated in meeting	Participated in follow-up
Bouvier	Lynn	Fisheries and Oceans Canada	✓	✓
Campbell	Lisa	LCA Environmental	✓	✓
Coker	George	Portt and Associates	✓	✓
Dextrase	Al	Ontario Ministry of Natural Resources	✓	✓
Dobbs	Fred	Nottowasaga Conservation Authority	✓	
Gibson	Scott	Ontario Ministry of Natural Resources	✓	✓
Hoggarth	Tom	Fisheries and Oceans Canada	✓	✓
Lenoir	Phil	Grand River Conservation Authority	✓	
Mandrak	Nick	Fisheries and Oceans Canada	✓	✓
Thomas	Jen	Fisheries and Oceans Canada	✓	✓
Yagi	Anne	Ontario Ministry of Natural Resources	✓	